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THEODORE L. PITT, EDITOR.

ERRATA.

"To err, is human—to forgive, divine;" and (adding a third leg to the adage for the benefit of such side-hill places as editorial and printing rooms), *to correct your errors, when found*, is the part of simple honesty, without which the forgiveness of others will not be of much avail. Wishing to observe this supplementary clause, we propose, if we cannot prevent some mistakes from creeping into our types, to take the first opportunity after detection, to cancel them by an exposure. That the effort at accuracy may be thorough it should extend from the correction of a mis-spelled word to that of mis-statements in science and theology. We choose to leave our record, if not brilliant, at least tolerably clean; deeming that there will be enough to attend to in the day of judgment without being bothered with a review of a thousand editorial and typographical mistakes that might have been wiped out as we went along. We will thank our readers to join us in this error-hunt, and help to bag all the game of that kind they can find lurking in our columns.

The following list of *errata* gathers up all the known slips in the past numbers of this volume, and will enable those who keep a file of the paper to rectify the mistakes noted, with a pen:

Page 11th, first column, at the bottom, the assertion that electricity is a substance, is not made by Prof. Tyndall, but rather is contradicted by him.—His doctrine is that electricity as well as heat is a mode of motion. The doctrine referred to, in the erroneous passage, is, that the *interstellar medium* (not electricity, but the source of electricity), is a real substance. This is the fact demonstrated in Prof. Tyndall's experiments.

Page 19, 3d column, 12th line, for *exit* read *exeunt.*

Page 21, 2d column, first line after the title, Vox DEI, for *Harmonium* read *Piano-Forte.*

Page 24, 3d column, 28th line from the bottom, for "His" read "This."

Page 28, near the top of the first column. Water is not the only exception to the rule that substances become heavier and their bulk diminishes when they become solid. Bixmuth is another exception. See Tyndall, page 95.

Page 30, 2d column, 18th line from top, Q. is in error in regard to the number of square miles in a circle with a radius of 12 miles. It is 452, instead of 225.

DAY AND NIGHT.

WHAT is DAY? It is a *globe* of light, of which the sun is the center, and the radius ofwhich, is a solar ray. Trace a sunbeam to its farthest range away in those regions of space where the sun is reduced to a star, and still farther on to where it is only a point for a telescope, and then millions of miles further to where its glimmer is but an infinitesimal part of an insoluble nebula, and you have the radius of that great globular space which in every hair-breadth of it is full of the sun's light. This great globe of light is, in the largest sense, the *thing* that we call DAY. Yet in its outer regions where the light becomes thin and finally fades to nothing, it is really but star-light.—Day in the sense of our *experience*, is a globe of light, the radius of which is the mean distance of the earth from the center of the sun—about 95,000,000 miles. The diameter of this globe is 180,000,000 miles, and its circumference is the earth's orbit—about 565,000,000 miles. The superficial area of this globe is over one hundred thousand millions of millions (100,000,000,000,000,000) of square miles, and its cubic contents are over three thousand millions of trillions (3,000,000,000,000,000,000,000,000) of cubic miles. We live on the surface of this globe of light, and sail round it every year; or rather the ball on which we are afloat *rolls* round it every year, turning over 365 times in the circuit. If we imagine a barrel floating down a stream, and also turning over and over as it goes, we have a good figure of the motions of the earth as it floats round its globe of sunlight. And only imagine further that a tribe of insects, riding on the barrel, are kept rolling first into the water and then into the air, and you will see how we inhabitants of the earth are every day ducked in sunlight, and every night rolled up into the dark. Our day, then, may be defined as an enormous globe of light, millions of times larger than the sun, on the surface of which the earth swims, and into which we are plunged by the revolution of the earth for a longer or shorter time every twenty-four hours.

But what is NIGHT? Night is a conical shadow. The light of the sun is not limited in its range to the globe we have last described, but, as we said at first, extends on to almost unimaginable distances. But the earth stops so many of the sun's rays as fall upon its disk, leaving always a shadow behind it, i. e., in the direction opposite the sun. This shadow extends far out into space, and may be conceived of as a constant attachment of the earth, like the tail of a comet. We know that it extends beyond the moon, for at certain times the moon enters it and is obscured by it for several hours, showing that at the distance of the moon, i. e., 240,000 miles, the earth's shadow is several times broader than the disk of the moon. The actual distance to which this shadow extends can easily be calculated. The diameter of the sun's disk is 882,000 miles, and that of the earth's about 8,000. The earth's diameter being so much smaller than that of the sun, it is evident that lines drawn from the circumference of the sun to the circumference of the earth (which lines would bethe boundaries of the intercepted rays), must converge, and if continued must form a cone terminating in an apex at some point beyond the earth. That point will be nearer or farther off according to the distance of the earth from the sun. The mean distance of the sun from the earth is 95,000,000 miles. We have then this proportion: as the difference between the sun's diameter and the earth's, viz. 874,000 miles, is to 95,000,000 of miles, so is the difference between the earth's diameter and nothing, viz., 8,000 miles to the distance of the apex of the cone; which gives us about 869,000 miles, or four times the distance of the moon. This then is the earth's constant shadow sticking out from it into space opposite the sun, as the earth rolls its annual circuit, viz., a cone of darkness, 8,000 miles in diameter and 24,000 in circumference at its base, and 869,000 miles in length from its base to its apex, having a surface of a little over ten thousand millions (10,000,000,000) of square miles, and solid contents of nearly fourteen millions of millions (14,000,000,000,000) of cubic miles. This is the thing we call NIGHT. It does not change its place with the daily revolution of the earth, but that revolution turns us round into it every twenty-four hours, as a man standing in the sunshine might turn round in his tracks so as to face first the sun and then his shadow, while the shadow would remain stationary.

From this view we get one rather pleasant conclusion, viz., that *night is a much smaller thing than day.* Look at the figures:

Globe of Light within the earth's orbit.	Miles in diameter	180,000,000.
	Circumference	565,000,000.
	Square miles of surface	100,000,000,000,000,000.
	Cubic miles of contents	3,000,000,000,000,000,000,000,000.
Cone of Darkness behind the earth.	Miles in diameter at base	8,000.
	Circumference at base	24,000.
	Square miles of surface	10,000,000,000.
	Cubic miles of contents	14,000,000,000,000.

Day is at least two hundred million times larger than night. We cannot but hope that GOOD is as much larger than EVIL.

THE ANSWER OF EXPLORATION.

NEW worlds await discovery. For ages the western continent awaited a Columbus. For thousands of years geographical knowledge was mostly confined to the countries adjacent to the Mediteranean waters of the eastern continent—southern, and southwestern, and southeastern Europe, western, and southwestern Asia, and northern Africa.—There were vague reports of far-off countries beyond the Indus and the eastern mountains; of remote islands in the west, beyond the pillars of Hercules. A thousand years before the Christian era, ships of Solomon sailed from Tarshish to Ophir and brought back gold; but how far they sailed is not reported; and though they lift for a season the curtains of some remote land, yet, when the fleets of the Israelite kings were wrecked or destroyed, it again became unknown. The ancients, with all their accomplishments in other things, appear to have known but little of the world they lived in.—The conquests of a Semiramis, a David, a Nebuchadnezzar, an Alexander or a Cæsar, bounded their geographical discoveries. And when Alexander, after traversing with his armies the region from Macedonia to the Indus, and from Persia to Egypt, lamented that there were no more worlds to conquer, he proclaimed the ignorance of his age. Even then, China, populated with her millions, was developing her peculiar institutions of government, religion, and society. On a distant continent were other nations, the remnants of whose history are recorded in mounds and curious ruins. Perhaps Solomon, so wise in other matters, knew more of other lands beside his own, than the other monarchs of those ages. His ships sailed far, and tribute was brought to his treasury from remote regions. But whatever the knowledge of the old ages, it was not till Columbus came that the earth really began to be known, thoroughly and scientifically. There was abundant speculation as to its form and the probability of other lands existing beyond the western sea, but none had gone there, none had come from there with reports. None sailing west, had found Cipango and the far Cathay, and come home by India and the Red Sea, and so demonstrated the earth to be a sphere. Thought of the possibility of so doing, indeed, glimmered on the horizon of the human mind.

At length Columbus appears. Gathering up all the fragments of geographical knowledge existing within his reach, canvassing old and new theories, he becomes convinced that the earth is a sphere; that the remote countries of eastern Asia can be reached by sailing westward. Uniting practical energy with theoretical speculation in his character, he determined, if possible, to explore the unknown waters of the west. The result is a matter of history, which every school-boy knows.

There is a profound lesson, in the history of geographical discovery, tracing it from its beginnings to its culmination in the labors of Columbus and of those who have profited by his heroic genius and inspiration. It illustrates a great law governing the acquisition of all knowledge. Are we surrounded by unknown realms? Do vague reports come to us, of indications on the horizon of human investigations, of continents of truth lying far beyond, rich, in gems, and gold, and groves of balm? Have intimations come to us from remote ages of other forms of existence, of fields of brighter, and more joyous activity, where the soul puts on eternal youth? Such a fact in the history of the world as the discovery of a new continent by Columbus, and the consequent development of exact knowledge concerning the form of the earth, the arrangement of the continents, the distribution of the islands, the bounds of the oceans, and other features of the globe, show that these reports, indications, and intimations which the past bring to us, only await their Columbus to become verified scientific facts, and to open the way to new shores, rendering them accessible to all who would voyage thither. Thenceforth, if men doubt the truth of the reported discoveries of the new continents and reject the evidences which have been brought back by explorers, they can follow the track of the Columbus who crossed the unknown seas, and behold for themselves.

In application of this principle let us consider the subject of Inspiration and of an Interior World.

From the remote past men have had intimations of an interior world, and of higher and more refined orders of existence. Individuals in some instances have reported that they had seen its far-off shores, or that strange and wonderful things had been observed drifting on the seas of human life, like the strange forms of vegetation which drifted from the west and were picked up by mariners before Columbus' time, which could be traced to no known outward region. In the old ages, it is said messengers or angels [ANGELOS, messenger], came from thence and communicated with men. One being, it is quite authentically reported in the old histories, claimed to have come forth from that world, to reveal its life to men here. It is said that he lived some thirty years among men; that he gathered a few followers who believed in him; and after being killed and buried in a sepulcher, that he rose from the dead, his body was changed by the power of the life that flowed into him from that world, and became adapted to the interior and higher conditions of existence which there prevail; and that in this state he manifested himself to his followers, in some sensible way, and after this manifestation to and communication with them, he departed to his former home, telling them that he would ere long come again to them and take them away with him. It is also reported that the followers of this man, or wondrous being who had been manifested in human form, remained faithful in their attachment to him, though he had become invisible to their outward senses; and that after a little while they became subjects of an influence flowing out from the world where their leader had gone, which gave them new and wonderful power—causing them to speak with new tongues, to heal the sick, to raise the dead, to deliver men from evil spirits. It also drew all those who were subject to its power into sympathy with each other, and made them of one heart and one soul, so that such love as the followers of this heavenly being manifested for each other, had never before been seen in the world's history. It is also reported that these persons prepared for a voyage to the country where their master had gone, and confidently expected not to die as other men had always done, but to depart, in a new way, about the time that certain outward events, which he had predicted would take place within their lifetime, should occur. Letters are still on record which they wrote to each other relative to this proposed voyage. What is still more wonderful and interesting, the outward events which were predicted as to take place about the time of their departure, actually occurred; and after those events, nothing was heard of these persons. They had disappeared entirely from the knowledge of men. Certain traditions sprung up about their fate, reported by some who represented themselves as friends and followers of them, but who evidently, according to historical report, were far enough from being like them, if we may judge of the lost ones by the writings they left behind them. These traditions pretended that they did not sail on their intended voyage, but were deceived, and met the common fate of men. But their sudden and simultaneous disappearance, and the utter silence of all succeeding history concerning them, tends to show these traditions to be mere inventions. This is the most notable case in all the history of the past, indicating the existence of an accessible interior world. It stands out above all other intimations, somewhat as the sailing of Solomon's ships from Tarshish did before the voyages and discoveries of Columbus. It points to some Ophir of the soul, from whence men in old days received argosies of opulent and precious goods, and for which a colony of persons, many of whose names have been familiar as household words in the hearts of generations, once set sail, disappearing beyond the horizon of time.

But this is not all. Thousands of other facts of lesser note in the history of mankind, point toward the existence of this interior world. Individuals in all ages have in some way believed in its existence. Prior to the notable instance we have already described, the Jewish nation for more than fifteen hundred years had been deeply imbued with a belief in the existence of that world, and had been subject to influences which could not be explained on any of the observed principles which govern in the outward sphere of life. In other nations, and in all ages, individuals have been subject to similar influences. Moreover, of late years, facts of this kind have multiplied exceedingly, until the questions of

the existence and nature of an interior world, and of the relations of men to its inspiration, have become themes of absorbing interest.

How shall the great questions which these facts raise, be settled? Evidently in the same way which Columbus settled the old geographical problems which had haunted the minds of men through all preceding ages—viz., *by actual, fearless exploration.* If the shores of our life touch on inner oceans, over whose waters we may reach realms of immortality and bliss, how vastly important is it that we voyage thither. If the old reports of an Ophir beyond the eastern seas, hung like a golden dream before the imagination of Columbus, ever beckoning him to do and dare, how infinitely more should the reports of an interior, spiritual Ophir, and of a wondrous voyage thither, call men to exploration of the soul-world. If the world which Columbus discovered so vastly exceeded in beauty and opulence and extent all that he had ever dreamed in hours of wildest imagination, how much more may the results of interior exploration exceed our thought or belief. If the discoveries of Columbus and his followers settled forever all the vague theories and problems of geography, how much more will interior exploration settle the great questions of a soul-world, and our relations to that world. Is it not in the highest degree UNSCIENTIFIC to neglect the hints and testimony of the past in regard to such a world, to ignore the aspirations and suggestions of our hearts, to disbelieve in its existence, and to seal that unbelief by refusing to attempt its exploration? Let a new world, and the voice of Columbus speaking across the centuries, answer.

FALSE INDEPENDENCE.

IN reading some books, the authors of which have entered on new fields of thought, we find our appreciation of them, frequently interrupted, by a recklessness in their estimate of things, which, from their intrinsic merits ought to be treated with reverence. It has become quite common with many otherwise free and noble writers, to assert their independence of the doctrines of Christianity, by exalting other systems of religion. They lead us back among the Vedas of the Brahmins, and the mythology of the Greeks and Romans, in search of truth. "These venerable works," say they, "speaking to us from out the mists of time, are the pure voice of nature. This is refined gold." On the other hand, treating of Christianity, they say with strange inconsistency, "Why be guided by these old fables? The truth is to-day."

When we read these authors (and there are many books by them we find profit in reading), we find ourselves viewing them, as one-sided. "Why is it," we inquire of ourselves, "that, with all this noble freedom in one direction, these men are deficient in the great element of liberty—the power of patient investigation?" In answering this question, we chanced upon the following reflections: Our minds seem to have two attitudes: the one attentive, receptive, and feminine; the other, original, independent, and masculine; and success depends, in a great measure, on maintaining the true balance between them. It is held among mechanics, that a good foreman, one who possesses the art of enlisting the enthusiasm of his men, and of securing prompt obedience, must first have been a good subordinate. We often see instances of men who come out with new ideas, with great power, and evidently with inspiration from some interior source, who, in a short time lose their freshness. In following the masculine, independent course, the reformer has forgotten the source of his power. Before he started he was teachable, and receptive. The promulgation of his principles should be the lesser part of his duty. A man should be part of the time a woman, if he would be the recipient of fructifying power. The receptive part of a person's nature, is as important as the originating part, if not more so.

There is a strange fascination to some, in pulling things down. They make it their life and righteousness. What they imagine as to the nature of heaven, they only know; possibly, that it will be an endless succession of time-worn creeds which they are to pull down forever, as the Mussulman foreshadows the delight of heaven from his own sensuous standard. When a thing really encumbers us, when we find it conflicting with the growth of what we know to be the seed of truth, then cast it down, or otherwise emancipate ourselves from it.—But do not let us enjoy the destructive process so well that we must go around abusing our teachers and friends.

We need *growth.* We need to suck the juices out of the things which underlie us. It is right to clear away the weeds to let young plants have a start; but we must remember that if the plants grow vigorously, by and by the *weeds cannot start.* The most stately forests have the the least underbrush. Men must not always go over the ground chopping up weeds; they must some time plant their vineyards. If weeds have overgrown the truths which Christianity offers us, let us cut away the weeds, but reverence the living, ever-abiding truths. If we patiently separate them from the parasites that would choke them and hide their beauty, we shall find them still evergreen, and full of perennial power.

T. R. N.

THE RHYMER'S RESOURCES.

RHYME certainly is not essential to poetry. Three things at least are far more important, viz., first, live thought; second, fitting language; and third, good rhythm. But as people who take a fancy to write poetry generally think more of the rhyming part of it than of anything else, and thus are apt to sacrifice or distort thought and language for the sake of the jingle at the ends of the lines, it may be useful to try to give such folks an idea of the general resources of the art of rhyming, that they may see how good a chance they have of suiting themselves with rhymes (if they will but take a little pains), without marring their ideas or forcing unnatural constructions upon their language.

In the first place there are Rhyming Dictionaries that can be had for a little money, in which every important word is set down, and with each all the words that sound like it. But a Rhyming Dictionary still more convenient and useful can easily be found in any one's own brain by the following process:—Take any word, say, for the present experiment, the word jingle; now in order to find all the words that will rhyme with that, begin at the beginning of the alphabet, and go through, thinking at each letter of any word or words that end in *ingle.* This can be done very rapidly. The mind talks to itself thus: "A, none; B, none; C, commingle; D, dingle; E, none; F, Fingal (possibly); G, none; H, none; I, ingle; K, none; L, none; M, mingle; N, none; O, none; P, none; Q, none; R, none; S, single, swingle; T, tingle; U, none; V, none; W, none; X and Y, none; Z, Zuingle. To sum up, here are nine words that rhyme with jingle, viz., commingle, dingle, Fingal, ingle, mingle, single, swingle, tingle, and Zuingle. Possibly a thorough Rhyming Dictionary might give a few more; but for practical purposes this method is sufficient, and is more convenient than a book. The more one practices it the swifter and surer will be his run through the alphabet, until at last he will find what he wants quicker than he could by hunting up a dictionary and then hunting out his word.

Supposing the rhymer thus equipped with a Rhyming Dictionary either in book or brain, (and if he has a Dictionary of Synonyms, so much the better), we will now set him to work on an actual couplet that is to be made to jingle. With a thought that wants utterance, and with due attention to grammar, rhetoric and rhythm, he has written his first line, allowing it to end as it pleases, only preferring that the last word should be one which his practice on the alphabet, as above, tells him will have plenty of rhymes to choose from. The word *jingle* we have seen has nine. Other words, such as *soar*, have many more. Some have one or more rhymes for almost every letter of the alphabet. It is best to let the first line end on such words if it is convenient. But this is not essential. The rhymer now carries his thought through the second line in its natural language, and if by good luck or foreordination and inspiration, it comes out right, i. e., with a passable rhyme to the end of the first line, so much the better. But this is not likely. Suppose then the second line ends naturally on a word that does *not* rhyme with the end of the line before. In this case (which presents in substance the whole difficulty of the business) several different things may be done to bring about the desired jingle, viz:

I. The last word of the second line may be exchanged for one of the same or similar meaning having the required sound, if such can be found. We must be careful not to accept a word that deviates in its meaning from that of the word that first occurred, *so far* as to betray the fact that it was chosen for the sake of the rhyme, or as to weaken and injure the thought. But generally several passable substitutes can be found for a word, some one of which may have the sound required. There are two ways of searching exhaustively for the word we want: 1. *By the Rhyming Dictionary* (either in book or brain). This method has already been explained. Taking the last word of the first line, we find all the words that will rhyme with it, and see if any of them can fairly take the place of the word that has fallen upon the end of the second line. 2. *By the Dictionary of Synonyms*, which gives us all the words that are the same or similar in meaning to any given word. In this case we take the word that ends the second

line, and finding all its synonyms, see if any one of them has the required sound. These two methods are nearly equivalent to each other, and may be used singly or combined.

II. If the effort to change the ending word of the last line fails, we may let that stand and make the same effort to change the ending word of the first line. We have the same chances and the same helps as before.

Having now before us, as the result of our labors on both words, all the equivalents of each, we can see, by a final survey, whether a rhyme can be brought about by an admissible change of *both*.

III. If the ending words cannot be changed, either or both of them, so as to make a rhyme without marring the sense or otherwise injuring the couplet, we must next try the effect of *inversion*, or changing the order of the words so as to bring a different word to the end of one of the lines. By such an inversion, either in the first line or in the second, or even in both, we may possibly bring about a rhyme, without changing the first chosen words at all, only their order. But here again we must be careful not to use an inversion that gives an awkward or ambiguous look to our work, and so betrays the labor for a rhyme. Many sentences can be inverted without injury. If one has occasion to say "I went on," but finds that the necessity of rhyme demands that he should say "On I went," he need not scruple to make the change. Indeed, such an inversion, though an after-thought, may actually increase the force of the expression, and so improve it. But this license of inversion is limited, and nothing spoils more poetry than the abuse of it. The *natural* shape of sentences is as beautiful and desirable in poetry as in prose, and all that is sacrificed of that for the sake of the rhyme, is a dead loss that no jingle can compensate.

This expedient of inversion, like that of changing the final words, can be tried first on one line, and then on the other, and finally on both.—And every new word that is brought to the end of either of the lines, gives opportunity for the repetition of the exhaustive experiments by the Dictionaries, which were detailed in the preceding sections. Thus the chances of success in the search for a good rhyme, increase in geometrical ratio.

IV. So far we have tried only change of the ending words, and change of the order of the other words. But it is evident that the entire language of one or the other or both of the lines may be changed. There are many ways of saying the same thing, of which one may be nearly as good as another. We may not have chosen the very best to begin with, and our search for a rhyme, instead of injuring the sense and force of our language, may, if properly conducted, help us to great improvements. We are at liberty then to reconstruct a line entirely, if all previous efforts for rhyme fail us; and to reconstruct it not only once, but exhaustively, i. e., to find all the possible modes of expressing our thought, and see which of them will give us a rhyme. And we may reconstruct not only one of the lines, but the other, and finally both.—The only limit of all this is, that we must not, for the sake of the rhyme, adopt constructions which injure the soul of what we have to say or give a forced, unnatural air to our language, that will inevitably betray the foolish sacrifice we have made.

Thus it appears that the chances of finding a good rhyme in any case, for a pains-taking artist, are many, almost infinite, amounting to certainty, so that there is really no excuse for sacrificing sense and simplicity of language to the exigencies of rhyming.

And besides all this, we may say for the encouragement of rhymers who feel poor and cramped, that there is in the very nature of language, an element that makes rhyming easy. That element may be expressed thus: In the original formation of language, kindred ideas naturally find their way into kindred sounds. Take for instance the mass of words that end in *ash*, and see what a thread of unity runs through the meanings of them. Crash, dash, gash, hash, lash, gnash, rash, smash, &c., &c. These words have a certain idea of swift motion in common, and something more, that we cannot stop to analyze. If a rhymer has a subject in hand which requires one of these words, he will be very likely to want some of the rest; at least it will be very easy for him to find a place for them. If he is speaking of a boy that is rash, we shall probably soon hear of a gash, and that may lead to an application of the lash; or a flash, say of powder, may produce a crash and a smash. This facility of rhyming in following out particular veins of natural thought, is very extensive in our language, and probably in all languages, so that we may say that rhyming, after all, has deeper foundations than the mere love of artificial ornament.

Indeed if we believe that God, by Providence or Inspiration has had anything to do with the formation of languages, it is not difficult for us to conceive that the chiming of particular words, even with a far-off view to particular poetical combinations, may be among the foreördained harmonies.

J. H. N.

NEWSPAPER WRITING.

In aiming at a true standard of Journalism, and opening our columns to contributions from the people, we will at the outset define, and if possible bar out one vice which, according to our observation, besets the editorial profession, viz., the habit of *patronizing* the performances of others. If a proper or laudable thought finds birth somewhere in the breast of man, must we therefore purr and cackle over it like a rooster over his new found tit-bit? If an honest thing is publicly done by Congress or the nation, must somebody stand ready to step up and pat the nation on the back, with a "good boy!" smile of approbation, as a man would give a jack-knife to an urchin with a clean face? But this thing is too often done, either from a silly idea that our endorsement is essential to give completeness and effect to the matter, or more often perhaps from a willingness to veil a temporary idleness and vacancy in ourselves by patronizing what seems to be progress in others. A helpful spirit of course is good; appreciation is good, but a flunkey kind of admiration is not in true taste. What! is goodness so rare that it can no longer come modestly, and be treated as a matter of course? Would it be well to have sunrise postponed till we could usher it in by a congratulatory flourish, or to have the bells rung in honor of a thunder storm? On the other hand, are we such weaklings in this grand, earnest universe, that we must lean for moral support on the good doings of others, and tipsily stagger from one lamp-post to another in the street of life? It is to be considered that a really good thing does not need our patronage; it has in it a self-asserting power, which our flattery would tend not to honor but only to deface. Let it stand, then, clothed in its own beauty and worth, a gift from God's abundance; and let us, as writers, rise up to the dignity of our own central thought. If that does not speak, we had better keep silence, remembering that it is but a cheap mode of aërostation to fly as the tail of other people's kites.

G. W. N.

FOOT NOTES.

II.

I am compelled by candor to admit that pedestrianism at present is altogether too mannish. Our civilization in some respects is such a poor, weak little mouse, that a free and simple companionship of men and women in excursions so dear to a walker, is a thing not to be thought of. In addition to this, woman has not yet won a sensible working and waking dress for herself. Nevertheless it is good for a man to keep himself in such condition, that he can do ten miles on short notice. The deficiency in this respect, to which many men and most women confess, is not a pleasant thing to contemplate. All this brings me to some

CONSIDERATIONS ON POWER.

I do not propose to speak of the power to govern; neither of intellectual, nor physical, nor moral power. Life power is what I have in mind; that something which includes all those other powers, and which gives weight of character to man; that which makes him strong, irrespective of his talent. It is that which gives momentum to the intellect; it is that which gives strong wings to genius; it is that which gives authority to morals. One man's life is a great strong blaze; another man's life is only a flickering candle. But if this great life-force is not transmuted into intellect and moral sense, it simply makes a tremendous animal. Without this intense vitality there can be no great achievement. If a race possesses this, you may be sure that a grand destiny awaits it. Cæsar relates in his "Commentaries" that once when he was about to engage in battle with the Germans, a great panic was excited in his Roman legions by the reports of those merchants who had visited Germany for traffic. These traders declared that the Germans had such fierceness of eye, that it was impossible to look at them. There is nothing to contradict this estimate of the ancient Germans, hyperbolical as it may seem. From that fierce and intense stock has sprung the dominant Anglo-Saxon race, as well as the Reformation, and a wonderful development of literature and art.

David, and Paul, and Luther, were undoubtedly men who were strong to the very base of their natures. We are told that "not many mighty are chosen;" but, nevertheless, it seems evident that God delegates his great works to the dynamic men.—Without attempting to tell here what they are, I will now simply affirm that there are indications which point to the conclusion that inspiration first comes to man through the passional or dynamic side of his nature.

Whoever has reflected upon educational themes, can scarcely have failed to confront the question I have indicated. It seems to me that we treat education superficially, until we thoroughly consider the importance of this great mass of passion and will that lies behind the intellect, like the great lump of iron behind the steel edge of an ax. A larger mold of men is what we want. And to get this, we must stop treating men like a miscellaneous lot of axes and hatchets that are only to be ground. We are enfeebled. We don't need new outlets for power, when power itself is what we lack. It is painful for me to know that a man thinks that the grinding he gets at college, is the thing to settle the great question

for him, when I see that greater weight of metal is what he needs. I am sick of a culture that don't look toward giving us strength of life. Instead of sending our average children to school, thinking to make uncommon men of them, let us first set them to seeking the sources of an intense personality. Let them make blood; let them cultivate, but not waste all its secret energies; let them seek faith and invite inspiration; for these are the channels for an influx of power. Life has not yet become so much a sinecure that we can afford to spare one atom of our vital momentum. I will here say distinctly what I have intimated above, that I do not wish to discourage culture; I only wish to have it backed by intense elemental energies. It is stimulating to think that there may yet be a university with a culture truly dynamic. If I have succeeded in turning attention to power, I shall think us one degree nearer to it; for the very appreciation of power, half exposes us to its influx. The central energy of the universe, if we watch for its channels, stands ready to fill us.

LOOKING AFTER THE TREES.

On one of the roads leading to West Rock are, or rather were, three trees—two oaks (*quercus alba*), and a walnut (*juglans nigra*), that had achieved royalty. One of the charms of this old region is, that a tree here and there has had an opportunity to reach the highest ideal of its kind. One soon comes to get a sort of property feeling in the noble objects with which he becomes familiar. But loving your neighbor's trees, so long as he holds the power to destroy them or put them to base uses, is as perilous as giving one's heart to a dusky woman in New Orleans, who may prove to be the property of another. Some time ago I noticed that one of these oaks had been cut down: it was but a sorry consolation, to think that at best its great strong arms would only go to strengthen the sides of some fine ship. When I last saw it, its trunk lay headless and armless like the torso of a giant; a large section empurpled by an extemporized ink, showed itself; and two men in blue overalls and armed with a saw, were wagging their heads at it. When a grand thing is destroyed, I say, somebody ought to be punished if he is not able to make a good defense. What do I care for the rights of property then? So I go to the side of the road; and, carried on over a chestnut rail splashed with lichens, there is a dialogue: "You are getting some pretty nice ship-timber out of that old oak?" "We are getting a lot of darned hard work out of it." I never saw one of these wary and unimaginative Yankees surprised into anything. "Oh! I reckoned you cut it down for ship-building?" "We could have got some, but it would have taken a good deal of work." "So you cut it down just to make wood?" "Can't use only the limbs for that:" and then they smiled at the idea of making fire-wood of that great knotted bulk. "I suppose you know that tree was one of the biggest oaks about here?" "Yes, it was a pretty big one." "Well, if I had wanted to buy your farm, I would have given you fifty dollars more for it if that tree had remained standing."—They didn't smile at that remark. I hope they are now suffering the pangs of an unavailing regret. I wonder such men don't burn their fences for firewood, and expose themselves to a lunatic asylum. I venture to assert that the owner of that oak, if he had let it remain standing and had attended well its discourse, would have got more good than from many a sermon. I will only state the text on which an oak enlarges. "Be strong; be patient in slow gains; grow only for noble uses."

Inflexible and deficient in grace, an oak is the very embodiment of sturdy endurance. Strength is its essence; it holds its limbs in an attitude that gives no hint of compromise with the wind or the law of gravity; its wood goes to strong offices; it is the last tree to fade or to drop its leaves; its fruit even, has a flavor that is tonic, and a mystic hint at virile energy, and a firm hold on the imagination. And how mendacious we are in our approval of this tree when we finish our houses with pine, and then hire some painter to stain it in imitation of oak.

It is my purpose to defend all noble men, and all noble trees, that by their splendid growing and being prove themselves more potent for good than any reformer. The fate of the oak had made me solicitous for the "big walnut" whose thick trunk, great limbs, and numerous crotches—suggestive of untold uses in a furniture shop, and of great gain—might possibly prove too much for its owner's love. Therefore with my eye I search out the sturdy man who owns it, and I salute him. He evidently has no poetic veneration for his giant, but is keeping it from some pride in its size; for he names what he thinks a fancy price for it. I try to strengthen its weak defense in his mind by telling him that it is the largest tree of its kind that I have ever seen in the State. Still I do not feel at my ease about it. Q.

HISTORY OF THE LOCOMOTIVE.

The invention and perfection of the locomotive steam engine, may justly be termed one of the greatest triumphs of the last hundred years. Its beginning was small and humble, and its struggle for existence and recognition, long and severe. Ignored, or laughed at by engineers, by statesmen, by politicians, hooted and mobbed by ignorant rustics, its unfortunate inventors and supporters avoided as fit only for the insane asylum, the ultimate success of the invention was for a long time extremely doubtful. But to-day it stands before us in all its glory and strength, as one of the mightiest works of man.

Solomon de Caus, a native of Normandy, France, seems to have been the first to conceive the idea of moving ships as well as carriages by steam-power. He presented his plans to Cardinal Richelieu, who sent him away without a hearing, and finally becoming weary of his importunities, shut him up in the Bicetre mad-house in Paris. The Marquis of Worcester when visiting Paris in 1641, was greatly impressed with the appearance of de Caus, and afterwards embodied portions of his (de Caus's) book in his "Century of Inventions."

Savery, the Cornish miner and engineer, also proposed the high pressure engine as a means of locomotion. He took no practical steps toward carrying out his idea, and the subject was dropped.

In 1759, Dr. Robinson presented the subject of high-pressure locomotive engines to James Watt, who was then engaged in improving and perfecting his condensing engine. Watt approved the idea, and afterwards went so far as to make out plans and specifications for a locomotive of sufficient size to carry two persons. He was too busy, however, to attend to the matter himself, and the machine was never built.

The first actual model of a locomotive engine of which we have a written account, was made in 1763, by a Frenchman named Cugnot. It was exhibited before the king, and moved with such force as to knock down a wall that stood in the way. Being considered too powerful and dangerous for practical use, it was sent to the Arsenal Museum at Paris.

In 1772, Oliver Evans, an American, made a working model of a steam carriage. In 1778, the state of Maryland granted Evans the exclusive right to make and use carriages propelled by steam. No practical results were, however, ever obtained.

In 1778 William Symington, the inventor of the steam-boat, constructed a model of a locomotive or steam carriage for common roads. He soon, however, relinquished his designs on account of the state of the roads.

The first English plan of a locomotive was made in 1784, by William Murdoch, the friend and assistant of Watt. It was on the high-pressure principle, and ran on three wheels. The boiler was heated by a spirit-lamp, and the whole machine was of very diminutive dimensions, standing a little more than a foot high. While experimenting with this Lilliputian locomotive, the following incident occurred, as related by Smiles in his Life of George Stephenson: "One night after returning from his duties in the mine at Redruth, in Cornwall, Murdoch determined to try the working of his model locomotive. For this purpose, he had recourse to a walk leading to the church, about a mile from the town. The walk was rather narrow and was bounded on either side by high hedges. It was a dark night, and Murdoch set out alone to try his experiment. Having lighted his lamp, the water shortly began to boil, and off started the engine with the inventor after it. He soon heard distant shouts of despair. It was too dark to perceive objects; but he shortly found, on following up the machine, that the cries for assistance proceeded from the worthy pastor of the parish, who, going toward the town on business, was met in this lonely road by the hissing, fiery little monster, which he subsequently declared he had taken to be the Evil One *in propria persona*.

No further steps were taken by Murdoch to embody his ideas in a more practical form.

In 1789 Thomas Allen, of London, published a plan of a steam carriage. He proposed to use cogged wheels, and calculated to attain a speed of ten miles an hour. The plan was extremely crude, and not even a model was ever made.

About the beginning of the present century the subject of the more extensive use of "tram-roads," as they were called, began to be agitated in different parts of England. While the discussion was going on, Richard Trevethick, a captain in a Cornish tin mine, determined to build a steam carriage for common roads. He took out a patent for his invention in 1802. This was the first successful engine constructed on the principle of moving a piston by the elasticity of steam against the pressure only of the atmosphere. This first steam carriage, adapted for actual use on common roads, was on the whole quite successful, and excited considerable interest in the neighborhood. While on the road to London for further exhibition, the well-known incident of the toll-gate occurred. The vehicle was proceeding along the road at the top of its speed, and had just carried away a portion of the rails of a gentleman's garden, when Andrew Vivian, Trevethick's assistant, descried ahead of them a closed toll-gate, and called out to Trevethick, who was behind, to slacken speed. He immediately shut off steam; but the momentum was so great, that the carriage proceeded some distance, coming dead up, however, just on the right side of the gate, which was opened like lightning by the toll-keeper. "What have us got to pay here?" asked Vivian. The toll-man, trembling in every limb, his teeth chattering in his head, essayed a reply—"Na—na—na—na!" "What have us got to pay, I say?" No—noth—nothing to pay! My de—dear Mr. Devil, do drive on as fast as you can! nothing to pay!!" The machine excited much interest and wonder while in London, and its inventor secured the support of Lord Stanhope, Davies, Gilbert, and others. Sir Humphrey Davy also took much interest in the affair, and was quite sanguine in his expectation of the ultimate success of the invention. The state of English roads, however, proved an effectual damper to the project; and after exhibiting it as a curiosity, Trevethick abandoned it as a practical failure.

In 1804 Trevethick built a new locomotive on an improved plan, it being designed for running on a railway. This engine was completed the same year, and tried on the Merthyr Tidvil Railway in South Wales. It proved a success on first trial, dragging several carriages loaded with ten tons of iron at the rate of five miles an hour. The waste steam of this engine was thrown into the chimney at a right angle, and consequently produced no effect in the way of a steam blast. This discovery was left for a more fertile and vigorous intellect to appreciate and make known. Although a success in the main, the engine was finally abandoned. The jolting of the engine fractured the cast iron rails, which were not calculated to bear so heavy a weight. It was finally dismounted and used for pumping water.

These first inventors of the locomotive, seem to have been impressed with the notion that the tractive power of an engine with smooth driving-wheels would not be sufficient to enable it to draw heavy loads, or, indeed to move at all. Full of this idea which, after all, was only imaginary, they contrived various methods for overcoming the supposed difficulty, without even taking the pains to experiment and satisfy themselves on the point. Trevethick proposed to have the periphery of the driving wheels made rough, by cross grooves or bolt heads, so as to enable the wheels to "grip" or "bite." This plan was adopted on the engine for the Merthyr Tidvil Railway, and its progress must have necessarily been

a succession of jolts very trying to the cast iron plates of the tram-road. In 1811, Mr. Blenkinsop of Leeds, took out a patent for a rack or tooth rail laid along one side of the road, into which the toothed wheel of his locomotive worked. Mr. Blenkinsop's engines began running on the railway from the Middletown collieries to Leeds, a distance of three and a half miles, on the 12th of Aug., 1812. They continued running for many years, and were the first instance of the regular employment of locomotive power for commercial purposes. From 1812 to 1813, a Mr. Blackett of Wylm was experimenting with locomotive steam engines. He finally established the fact that the weight of the engine itself was sufficient to produce the necessary "bite" of the drivers.

We now come down to the time when George Stephenson, the humble engine-wright of Killingworth, comes into the field as a locomotive builder. By long and careful study and observation Stephenson had become thoroughly acquainted with the principle of the high-pressure engine. He carefully inspected the "Black Billy," an engine made by Mr. Blackett, and declared that he could make one superior to it. He also examined other engines, and satisfied himself that he could surpass them in every respect. Full of enthusiasm on the subject, he laid his plans before the lessees of the Killingworth mine in the year 1813. Lord Ravensworth, the principal partner, having been before favorably impressed with Stephenson's ability and good judgment, advanced him the necessary funds, and he went to work. His main difficulty lay in not being able to procure skillful mechanics to assist him in his new undertaking. He persevered, however, and at length, after ten months of labor and anxiety, the "Blucher" was finished and placed upon the Killingworth railway on the 25th of July, 1814. The wheels of this engine were all smooth, Mr. Stephenson having satisfied himself by actual experiment that the weight of the engine itself would give it sufficient adhesion for the purposes of traction.

This engine succeeded in ascending a gradient of 1 in 450, drawing after it eight loaded carriages of about thirty tons weight, at four miles an hour, and for some time afterward continued regularly at work. It was the most successful working locomotive engine that had yet been introduced. Upon comparing the cost of running it with horse power, it was found, that there was little to choose between the two, the chief difficulty being in its inability to generate steam fast enough. This state of things continued until Stephenson suddenly discovered the value of the steam blast through the chimney or smoke stack. On applying it to his engine its powers and capabilities were doubled immediately, and the question of the comparative value of steam and horse power was settled forever.

During the year 1815 Stephenson improved and perfected his engine in several important particulars, producing at last a locomotive, which, though rough and crude as it was, contained the germ of all that is now known in the practical working engines of the day.

From the year 1815 to 1820 Stephenson's engines were working on the Killingworth tram-road, in comparative obscurity. Stephenson himself being an unlettered man, could not bring his ideas before the public, and so contented himself with patient study of the subject, in his own mind firmly convinced that sooner or later his improved locomotive would revolutionize the world of traffic.

In 1823 the Stockton and Darlington Railway Act was passed, and George Stephenson was appointed engineer of the road, at £300 per annum. About this time Stephenson was much impressed with the importance of establishing a factory for building locomotives, as a sort of school for educating and producing locomotive engineers. He consulted with his friends, and after some delay, a piece of land was bought for the purpose, in Newcastle, Aug. 1823. A small building was soon erected, which formed the nucleus of the gigantic establishment afterwards formed around it, and active operations were commenced early in 1824.

The Stockton and Darlington line was opened for traffic on the 27th of September 1825. The engines for the road were built by Stephenson, and a vast concourse of people assembled to witness the opening of the first public railway. The train consisted of six wagons loaded with coal and flour, after these came the passenger coach filled with the Directors, then followed six wagons of coal, and lastly 21 carriages filled with passengers. Stephenson himself drove the engine. An eye witness thus describes the scene: "The signal being given, the engine started off with this immense train of carriages, and such was its velocity, that in some parts the speed was frequently 12 miles an hour: and at that time the number of passengers was 450, which, together with the coals, merchandise, and carriages, would amount to near 90 tons. The engine with its load, arrived at Darlington, a distance of 8¾ miles, in 65 minutes. The six wagons loaded with coal were then left behind, and obtaining a fresh supply of water and arranging the procession to accommodate a band of music, and numerous passengers from Darlington, the engine set off again, and arrived at Stockton in 3 hours and 7 minutes, including stoppages, the distance being nearly 12 miles." By the time the train reached Stockton, there were about 600 persons in the train or hanging on the wagons. "The arrival at Stockton," it is added, "excited deep interest and admiration."

The immense growth of trade between Liverpool and Manchester, at length forced the leading business men of the day to devise some other means of transportation than what then existed, between those cities. The Bridgewater canal was entirely insufficient, and in the winter utterly useless.—Horses and common carriages were totally incompetent for transportation purposes on such an immense scale as the case required. Nothing remained but a trial of the tram-road or railway. In October 1824 a prospectus was published, of a scheme to form a double line of railway between Liverpool and Manchester. This paper was signed by many of the leading men of both these cities, and the estimated cost was put at £400,000. The shares were soon taken, and in March 1825, the bill went into the Committee of the House of Commons. As was expected, it there met with a tremendous opposition. The party representing the canal interests, summoned their whole strength to crush the innovators. Stephenson himself was brought on to the witness stand and cross-questioned so pertinaciously by eight or ten lawyers, that he wished, as he described it, "for a hole to crawl out at." A Mr. Alderson, in particular, subjected him to a severe and protracted examination, as to the speed of the locomotive, the strokes of the engine, the slipping of the wheels on the rails, and various other points. Hour after hour did he stand there, teased and tormented by men who possessed but little practical information on the subject, and whose only object seemed to be to confound if possible this earnest advocate of the new system. One of the Committee put the following question: "Suppose now one of these engines to be going along a railroad at the rate of nine or ten miles an hour, and that a cow were to stray upon the line, and get in the way of the engine: would not that, think you, be a very awkward circumstance?" "Yes," replied the witness, with a twinkle of his eye, "very awkward indeed—*for the cow!*"

After a protracted struggle, the bill was defeated. Nothing daunted, however, the bold projectors of the new system organized anew, and presented it again at the next session of Parliament, and at length after expending the sum of £27,000 the Act was passed, authorizing the construction of the road. After deliberating some time, the Directors appointed Stephenson engineer of the line. Upon receiving his appointment he removed his residence to Liverpool, and commenced what was then deemed an utter impossibility, viz., the building of a railway from Liverpool to Manchester over Chat Moss.

For three years the work steadily progressed, and at length approached completion. The next question was, the power to be used; for the thick-headed Directors were not even yet convinced as to the unrivaled merits of Stephenson's locomotive engine. At each meeting on the subject they grew more and more bewildered. At length after consulting every engineer they could find, they offered a prize of £500 for the best locomotive engine, which on a certain day should be produced on the railway and perform certain conditions in the most satisfactory manner. The conditions were these:

1. The engine must effectually consume its own smoke. 2. The engine, if of six tons weight, must be able to draw after it, day by day, twenty tons weight (including the tender and water tank) at ten miles an hour, with a pressure of steam on the boiler not exceeding fifty pounds to the square inch. 3. The boiler must have two safety valves, neither of which must be fastened down, and one of them be completely out of the control of the engine-man. 4. The engine and boiler must be supported on springs and rest on six wheels, the hight of the whole not exceeding fifteen feet to the top of the chimney. 5. The engine, with water, must not weigh more than six tons. The Company to be at liberty to test the boiler, &c., by a pressure of one hundred and fifty pounds to the square inch. 6. A mercurial gage must be affixed to the machine, showing the steam pressure above forty-five pounds per square inch. 7. The engine must be delivered, complete and ready for trial, at the Liverpool end of the railway, not later than the 1st of October 1829. 8. The cost of the engine must not exceed £550.

It was now felt that the fate of railways, and of locomotives in particular, depended on this appeal to the mechanical genius of England, and the progress of the undertaking was watched by all classes with deep interest. Stephenson now felt that the long hoped for time had arrived for him to prove to the world that he was a man of his word. He accordingly recalled his son Robert from America, placed him in charge of the locomotive works at Newcastle, and commenced building the "Rocket" engine, for competition at the grand trial in October. As this was to be his greatest effort in the line of locomotives, he had it constructed with all possible care. It contained all the improvements that his long experience had suggested to him, and before the time appointed it was finished, tested, and shipped to the place of trial near Liverpool.

On the day appointed for the great competition of locomotives at Rainhill, the following engines were entered for the prize:

1. Messrs. Braithwaite and Ericsson's "Novelty."
2. Mr. Timothy Hackworth's "Sans-pareil."
3. Messrs. Stephenson and Booth's "Rocket."
4. Mr. Burstall's "Perseverance."

The ground on which the engines were to be tried was a level piece of railroad, two miles in length. Each engine was to make twenty trips, equal to seventy miles in the course of the day, at a rate not under ten miles an hour. The day fixed for the trial was the 1st of October, but it was postponed to the 6th. Stephenson's engine being the first ready, it was ordered out for an experimental trip. On that day it ran twelve miles in fifty-three minutes. The "Novelty" came next. The peculiarity of this engine was that the air was driven through the fire by a bellows or fan. There being no load ready, no particular experiment was performed with this engine The "Sans-pareil" was next exhibited, but not experimented with on that day.

The next day the blower of the "Novelty" gave way, disabling it from further trial. A defect was also discovered in the boiler of the "Sans-pareil." On the morning of the 8th of October the "Rocket" was again ready for the contest. In fifty-seven minutes it had steam up for the final trial, and started off dragging thirteen tons weight in wagons. The first thirty-five miles was run in an hour and forty-eight minutes. The next ten trips in two hours and three minutes. The maximum speed of the Rocket during the final trip, was twenty-nine miles an hour, or about three times the speed that one of the judges had declared to be the greatest within the limits of possibility. The average speed for the whole journey was fifteen miles per hour, or five miles beyond the specified conditions of the Company. At the close of the "Rocket's successful trial, Mr. Cropper, one of the directors, lifted up his hands and exclaimed, "Now has George Stephenson at last delivered himself."

The other three engines made several trials, but proved failures, and the prize was accordingly de-

livered to Stephenson. After the contest was over, the "Rocket" was again brought on to the ground, and, detached from all incumbrances, made two trips, running at the rate of thirty-five miles an hour.

This famous trial settled the question at once as to the comparative merits of the different systems of locomotion, and started a spirit of railway enterprise and enthusiasm which outstripped even the wildest conceptions of its most devoted advocates, revolutionizing the commercial world, and binding mankind with bands of iron in closer bonds of unity and peace. E.

EXPERIMENTS IN FISH-BREEDING.

I.

The art of propagating fish was discovered by the French, about the year 1448. Since that time, many experiments have been made with different varieties of fish. Very successful experiments have been made in Scotland, where the sea-salmon are bred in great numbers. Much attention is also being given to pisciculture in France at the present time.

My experiments have been confined to the speckled or brook trout only, and though pursued with but moderate opportunities as yet, they have been sufficient to demonstrate the practicability of pisciculture to my own mind.

To a lover of the "gentle art," there is no sport equal to trout fishing. The beautiful form of the fish, its gay colors, and graceful motions in the water, always excite our admiration. Its home is in the pure mountain stream, or the clear running brook. The season is in the early summer, when the earth has donned her gayest attire; and the angler, as he pursues his favorite sport, is brought into contact with nature in some of her most agreeable aspects. His slow, cautious movements are favorable for contemplation. The stream, whose course he follows as it winds its way from one side to the other of the mountain gorge, leaping this precipice, and then almost hiding itself under that shelving rock, constantly changing its form and appearance, seems almost like a thing of life. Its breadth may be spanned by a step, yet it has flowed on its course for thousands of years; the murmur of its little waterfalls has perhaps not been hushed since the mountains were formed. And then the skill and tact requisite to success keep the mind of the trout-fisher active and on the alert. His practiced eye detects at a glance the home of the trout, and just where and how to throw the luring bait. Watch his stealthy movements as he approaches that sheltered pool, where you hear the low, murmuring sound of falling water. With a skillful motion of his rod, the tempting bait falls like a snow-flake just below the rim of white foam. How quick his line runs off! There! it goes to the other side of the basin, and now up under the fall. Another moment and a half-pounder is swinging in the air, and drops panting at his feet. He baits, and makes another cast; away goes his line, and another noble fellow is bagged. And so he goes, picking one out of this hole, and another from that, while the uninitiated will go down the same stream and catch nothing but shiners and dace. But I am digressing from the purpose of my theme, which is to show that it is a practical thing to raise brook trout, and that by a little concert of action, nearly all our streams might be made to abound with this fine fish.

The Quinnipiac has forty or fifty tributaries, each of which is capable of producing probably a million of trout annually. In a short time they would exterminate the worthless fish that now infest its waters, and make it a paradise for the sportsman, and a source of profit and luxury to the community at large. In my next I shall attempt to show how this can be done, by relating some personal experiments and observations on the trout. B. B.

RAMBLES FROM MOUNT TOM.

IV.

I propose that to-day we go and look at that ledge of conglomerate rock, that we visited a while ago, and give it a more careful examination. I may as well observe as we proceed, that this kind of rock, in different forms, covers quite an extensive area of country around us. I find it stated in Professor Dana's Manual of Geology, that it extends from New Haven to the northern line of the State of Massachusetts, a distance of one hundred and ten miles, and is about twenty miles wide. It presents a good specimen of what is called secondary, in distinction from what is called primary rock. By secondary rock, is meant a kind of rock that is composed of materials that evidently once constituted an older or primary rock. By primary rock, is meant that kind, the origin of which we cannot trace to any other kind of rock. My object in visiting this ledge to-day, is to examine into the evidences that it is a secondary rock, and if possible to trace its origin and manner of formation.

Our road, you perceive, lies along this trout brook which we visited when studying bowlders. Yonder is the conglomerate rock. The stream, you will notice, has laid bare a perpendicular ledge which is about fifteen feet high. The debris of the disintegrated rock near the upper or west end of the ledge, rises nearly to the top, while near the middle and lower end the water seems to have washed away the loose material. Observe the color of the rock also. It is what you would call a red sandstone if it were composed of a little finer material. Look there, just under that slab of red sandstone protruding near the top of the ledge. You see there the edge of a thin stratum of pebbles laid very evenly along under it. Some of them are as large as goose-eggs, and very smooth. We could scarcely have a stronger reminder of the bottom of a shallow river than this. Here in another place you see the edge of a regular layer of a kind of gravel that is of a uniform coarseness, and there just below it you see another layer of the same material, but very much finer. It has precisely the conformation that you will find in any common gravel bank of recent formation in the river, the difference being that it is somewhat more consolidated. This consolidation seems to be at least partly due to a reddish iron cement that pervades it. You see the rock is of rather a loose texture, easily hammered to pieces. For this reason the frost and water disintegrate it rapidly.

The evidences that this rock was formed by the agency of water, may be briefly summed up in this way: In the first place it is in great part composed of rounded pebbles; and we know of no agency in nature that will give fragments of rock this smooth and rounded character, except water in motion. In the second place, the constituents of this rock are deposited in regular layers. We know of no other agency in nature that could leave such materials in that shape.

Now we will examine the east end of the ledge where the rock looks so much redder than it does here. There the rock loses its gravelly character, and has a kind of shaly or slaty structure, and is full of minute shining scales. Look at the red mud at its base, which is evidently the result of its disintegration. It has almost the character of clay, and is full of the same shining scales that are found in the rock. These scales are called mica.

Having examined the rock in its general characteristics, let us give a more careful attention to the different materials of which it is composed. You see that there is much difference in the appearance of the small stones which constitute this heap of gravel. Here is a pebble as large as your fist, and of a kind that represents the largest part of those in the heap. I will wash it in the stream and hold it up to the sun. You see it is quite translucent, and has a glassy, crystalline character, and that the point of my knife does not scratch it on account of its hardness. It has moreover a slightly pink color in common with most of the others of its kind in the heap. though it often varies in color from white to black. Neither is it always transparent or translucent. Flint is one form of it. The name of this mineral is quartz.

Here you see is another kind of pebble. It is not quite as hard as quartz, for I can scrape some of it into a kind of flour with my knife blade. It is not translucent like quartz. When you break it, it cleaves in one direction, and has a lustrous, pearly surface. It is usually white or flesh-color. This mineral is called feld-spar.—To sum up the principal constituents of this rock, we may say that it is a conglomeration of rounded pebbles of quartz and feldspar, apparently held together by a red, iron cement. Right in connection with it, is the reddish slaty rock filled with mica.

Here is a pebble containing all three of these minerals in one integral mass, which evidently has not been separated into its constituent parts since it came from the primary rock. The scales of mica are much larger than those in that red mud that we were noticing. There is a collection of them as much as half an inch in diameter that I can peel off with my knife point, where they lie, one over another.

This, then, is the character of the primary rock from which this is derived, and this answers exactly to the description that we have of granite. Go twelve or thirteen miles east of here, and you come to great ledges of granite. You will there find that though these three minerals, quartz, feldspar, and mica, occur in pretty large masses in the granite, (especially the quartz and feldspar,) they are compacted tightly together, and there is no sign of their corners having been abraded. Neither do they show such marked signs of having been deposited in layers as this rock does. Then again, if you go about seven miles west of us you will also find granite, though it is somewhat finer grained, contains less mica, and has not so much of a pink color.

From all these evidences, I infer that this secondary conglomerate rock, is the result of the disintegration of the older crystalline granite, such as lies on each side of us.

"There certainly seems to be pretty good

internal evidence of that proposition; but I do not see how it is possible that such an immense deposit of gravel could be removed this distance."

True, that seems a rather difficult point to demonstrate, especially in the present state of our knowledge, and it is evident that we shall have to appeal to books, or in other words to the observations of others, in order to get at all the facts bearing upon the question. Perhaps we may in future see fit to discuss this, among other questions that have naturally arisen in our minds, as the result of our observations in these rambles. But it is quite manifest that this kind of discussion will take us out of the range of our short walks about home. H. J. S.

THE NEW ATLANTIC CABLE.

As a new attempt is to be made in the summer of 1865, to connect Europe and America by a telegraph cable from Ireland to the coast of Newfoundland, we think the following description of the new cable, from the London *Observer* will be interesting to our readers. Should the new enterprise prove successful, we shall all want to know how the material medium is made, through which the Old and New worlds will talk with each other:

"In the construction of the telegraph cable, the great and difficult problem to solve was, how to arrange the various parts so as to prevent any strain upon the 'core.' There are some portions of the Atlantic where the depth is more than two and a half miles, and the mere weight of such a length of cable as would extend from the bottom of the ocean to the ship, would be sufficient, unless proper precautions were taken, to stretch and probably to break the communication. The line which was first constructed, failed in consequence of this point not having been kept sufficiently in view—its specific gravity was much too great for its strength, and it was the strain upon the inner core which was, no doubt, the cause of the failure. The new cable, like the first one, has a center or core formed of 7 copper wires—6 laid round 1. The weight of copper in these wires is, however, 300 lbs. for each nautical mile, as against 106 lbs. in the first cable. This is in itself an important point of difference, the weight of copper for the conducting wires in the whole length being more than 200 tuns greater than in the first cable. The gauge of the wire to be used is that known as No. 18. These conducting wires are to be insulated by four layers of gutta-percha, laid on alternately with four thin layers of the material known as Chatterton's compound, the diameter of the core thus covered being rather less than half an inch, the exact figures being .464 of an inch, and the circumference 1.392 inch. In the first cable the core was protected by three coverings of gutta-percha, weighing 261 lbs. per nautical mile—the difference between the nautical and geographical mile is in the proportion of 2,126 to 1,760 yards—the weight of the insulator in the first cable was 261 lbs.; in the one now about to be constructed it will be 400 lbs. per mile.

"The next important point to be considered is the protection to be afforded to the core, and the insulating portions. In the first place there will be a "padding" or coating of soft jute yarn, saturated with a preservative mixture, which will be wound round and next to the insulating outer surface of gutta-percha. This will help to resist the strain which will be brought to bear upon the cable when a great length is paid out in deep water. Outside of this padding is the coating, employed only for protective purposes, and forming, of course, no part of the telegraph proper. This consists of 10 solid wires, of the gauge .095, drawn from homogeneous iron. Each of these wires is surrounded separately with five-strand tarred hemp, the whole of these 10 strands are to be laid spirally round the padded core, and they are formed in such a manner that when a heavy strain comes upon it the wires will lend their strength to the cable. The improvement which the present cable offers over the first one in this respect is very great. In the first cable the protection of the core was sought to be effected by 18 strands of charcoal-iron wires. These were laid spirally round and upon the core. In paying out the cable the whole strain came upon the core or inner portion, and not upon this outer coating of wire, which really served only to increase the specific gravity of the cable, without giving to it any additional strength. The cable about to be manufactured has a vast superiority over the former one in regard to its specific gravity. The first one weighed, in air, 20 cwt.; the present one will weigh 34 cwt. to the nautical mile. In water, however the weight of the first cable was 13.4 cwt. per mile; the specific gravity of the present one, notwithstanding its greater strength and increased diameter, weighs but 14 cwt. When it is considered that probably some six or eight miles of the cable will be suspended in water between the points on which the cable rests at the bottom of the ocean, and the ship from which it is being paid out, it will be seen at once how important is this great increase of strength, obtained as it is with so small an addition to its specific gravity. The weight of the respective cables in air is as 20 to 34 cwt., while the specific gravity, or weight in water, is only a few pounds greater.—Buoyancy combined with strength appears, therefore, to have been obtained in a very satisfactory manner. The hemp which surrounds the protecting covering of the iron wires is much lighter than water, hence the comparatively low specific gravity.

"Another important point is the strength or breaking strain of the cable. The breaking strain of the first telegraphic cable was 65 cwt., that of the present one is 155 cwt., or considerably more than twice that of the former. The new cable is equal to eleven times its weight per nautical mile in water. In other words, if the cable were suspended in water it would bear its own weight for a depth of eleven miles. Now, as the deepest part of the Atlantic, between Ireland and Newfoundland, is 2,400 fathoms, or about two miles and a half, it follows that the cable will bear a strain equal to 4 .64, or nearly five times its own vertical weight, in the deepest water in which it will be submerged.

"The distance to be traversed between Ireland and Newfoundland is 1,640 miles. The first cable was laid with 15 per cent. of "slack" over and above the actual mileage. If the whole of the line be taken on the *Great Eastern*, as is intended, it is probable that this amount of "slack" may be considerably reduced. It is intended, however, with a view of providing against all contingencies, to manufacture 2,300 miles. The total weight of the cable to be laid will be 4,122 tuns, a burden which to the *Great Eastern* will be a very trifling affair. The actual cost of the telegraph and the expense of laying it are to be defrayed out of the new capital of £600,000, upon which there is a joint guarantee of the British and American Governments of 8 per cent."

NEWS ITEMS.

WHILE THE ATTENTION of the world has been directed to the war in Northern Europe, it seems that the materials of revolutionary outbreaks have been rapidly accumulating in several places in southeastern Europe. In Venetia, a Committee of Action are circulating a stirring proclamation to the Venetians and Tristines, declaring their expectation that the Dano-German conflict will prove the forerunner of greater and rapidly spreading commotions. "Powerful nations," they say, "will stand at our side, and in the interior of the country affairs are assuming a shape which permits us to hope for the best. We announce that your Committee of Action has agreed with the Central Committee founded by Garibaldi, and the Insurrectionary Committee in Hungary and Gallicia, that the movement shall break out simultaneously in all places." In Hungary very extensive preparations have for some time been making for a rising of the people. In Pesth a riot took place on the 13th of March, and the crowd raised the cry of "Long live Kossuth!"—"Long live Garibaldi!" The agitation in Gallicia is so great as to have induced the Austrian government to declare the province in a state of siege. The news from Northern Turkey is no less exciting. The Danubian Principalities also are uneasy, and have become the place of rendezvous for large numbers of Polish, Hungarian, Italian and French refugees; and the Austrian government believes not only that the people of the Principalities will not hinder but that they will even assist them. According to a recent report from St. Petersburgh, the Russian government suspects France of countenancing and encouraging these revolutionary schemes, and there is much coolness between the two governments in consequence.

THE STEADY progress of social and political regeneration in the Russian Empire is one of the most interesting and noteworthy signs of the times. The abolition of serfdom, the introduction of a constitutional form of government in the Grand Duchy of Finland, the creation of district and provincial representative assemblies in Russia, and other reformatory acts, have recently been followed by a ukase declaring the Polish peasants proprietors of the land which they are at present cultivating. This measure is sweeping, radical, and admits of no exception. Still further, the Polish peasant becomes not only his own master, and a freeholder, but he ceases to be subject to the jurisdiction of the noblemen who hitherto have had almost unlimited control over him. Hereafter the peasants will have the right of government, and will themselves choose the local authorities. The immediate effect within the Russian Empire will probably be to suppress the Polish insurrection. The Polish peasants will look upon Alexander II as their liberator from abject servitude, and undoubtedly a strong Russian party will spring up in Poland. By this reform the number of freeholders in Russia and Poland will be immensely larger in proportion than in England; and they will enjoy more freedom and will be more independent of the nobles than the peasantry of many of the German and Prussian provinces.

THE JAPANESE Embassadors, who are on their way to Paris, are telegraphed from Suez. Besides Paris, where they are to apologize for the misdeeds of their government, they are to visit London, Vienna, and also Switzerland, whither they are going to see an existing republic.

WILLIAM D. TICKNOR, of the firm of Ticknor and Fields, Boston, died suddenly in Philadelphia on the 10th inst., aged about 53

MISQUOTING THE SCRIPTURES.

We have heard of many amusing mistakes made by persons who attempted to quote passages from the Bible, who were, however, somewhat lacking in their acquaintance with that best of books.

In the winter of 18—, the debating society of O—— had up for discussion one evening the subject of labor. The arguments pro and con were long and exhausting. Finally Q. arose for a clincher.

"You see," said he, "labor is natural; *hard* labor, *real* hard; and it was ordained by the Lord, too. Don't you remember what he said to Adam? 'Thou shalt earn thy bread by the sweat of thy brow, and *on thy belly shalt thou go all the days of thy life.*'"

The following case affords an example of a ludicrous confounding of Scripture chronology:

One of those worthy old ladies who unwittingly furnish so much material for the amusement of an ungrateful world (though we verily believe that many things laid to their charge are mere fabrications), was telling her neighbor, another equally worthy old lady, what an excellent meeting they had where she attended the previous Sunday, and what a beautiful sermon their minister preached; expressing also her regret that her neighbor had not been there to hear it. On being asked what the minister's text was, she said that she could not recollect exactly what chapter and verse it was, but that she well remembered the words, which were these: "And Abraham said unto David, while he was yet in the whale's belly, Almost thou persuadest me to be a Christian."

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